```
     FILE 'REGISTRY' ENTERED AT 15:11:16 ON 10 FEB 2004
L1          577 S (1303-00-0 OR 22398-80-7 OR 106070-25-1 OR
                106603-89-8 OR 106604-01-7 OR 106604-03-9)/RN OR (IN P SB OR
                AS GA SB OR AS GA OR IN P)/ELF OR (IN.P.SB OR AS.GA.SB OR
                AS.GA OR IN.P)/MF
     FILE 'HCAPLUS' ENTERED AT 15:11:17 ON 10 FEB 2004
L2       516322 S GRAD?
L3         4214 S M!FET# OR HEMT OR ELECTRON#(2A)MOBIL?(2A)TRANSISTOR?
L4       277099 S CHANNEL#
L5              QUE VARIE## OR VARIABL? OR VARY#### OR PROFIL?
                OR INCREAS#### OR DECREAS#### OR CHANG? OR LARGE? OR SMALL? OR
                LOW OR LOWER? OR LOWEST OR HIGH OR HIGHE##
L6              QUE PROPORTION###### OR RELATION? OR WIDE####
                OR BROAD OR BROADE? OR NARROW#### OR TAPER#### OR CONTRACT##
                OR CONTRACTING OR REDUC##### OR ATTENUAT? OR COMPRESS####
L7              QUE EXPAN##### OR THIN? OR THICK? OR SPLAY? OR
                FUNCTION#### OR INHOMOGENOUS? OR NONUNIFORM? OR (UN OR
                NON)(2A)(UNIFORM OR HOMOGEN? OR CONSTANT?) OR "NOT UNIFORM" OR
                "NOT HOMOGENOUS" OR "NOT CONSTANT"
L8              QUE COMPOSITION? OR RATIO? OR AMOUNT? OR CONCENTRATION? OR DISTRIBUT?
L9      2509275 S ((L5 OR L6 OR L7 OR L8))(5A)L8
L10        5042 S L1 AND L2
L11          84 S L10 AND L3
L12       18437 S L9 AND L1
L13         292 S L12 AND L3
L14         105 S L13 AND L4
L15         174 S L11 OR L14
L16      135134 S ((((VARIE##/TI OR VARIABL?/TI OR VARY####/TI OR PROFIL?/TI OR
INCREAS####/TI OR DECREAS####/TI OR CHANG?/TI OR LARGE?/TI OR SMALL?/TI OR LOW/TI OR
LOWER?/TI OR LOWEST/TI OR HIGH/TI OR HIGHE##/TI) OR (PROPORTION######/TI OR
RELATION?/TI OR WIDE####/TI OR BROAD/TI OR BROADE?/TI OR NARROW####/TI OR TAPER####/TI
OR CONTRACT##/TI OR CONTRACTING/TI OR REDUC#####/TI OR ATTENUAT?/TI OR
COMPRESS####/TI) OR (EXPAN#####/TI OR THIN?/TI OR THICK?/TI OR SPLAY?/TI OR
FUNCTION####/TI OR INHOMOGENOUS?/TI OR NONUNIFORM?/TI OR (UN/TI OR
NON/TI)(2A)(UNIFORM/TI OR HOMOGEN?/TI OR CONSTANT?/TI) OR "NOT UNIFORM"/TI OR "NOT
HOMOGENOUS"/TI OR "NOT CONSTANT"/TI) OR (COMPOSITION?/TI OR RATIO?/TI OR AMOUNT?/TI OR
CONCENTRATION?/TI OR DISTRIBUT?/TI)))(5A)(COMPOSITION?/TI OR RATIO?/TI OR AMOUNT?/TI
OR CONCENTRATION?/TI OR DISTRIBUT?/TI))
L17      185481 S GRAD?/TI OR L16
L18          25 S L15 AND L17
L19         840 S (1303-00-0 OR 22398-80-7 OR 106070-25-1 OR
                106603-89-8 OR 106604-01-7 OR 106604-03-9)/RN OR (IN P SB OR
                AS GA SB OR AS GA IN OR GA IN SB OR AS IN P)/ELF OR (IN.P.SB
                OR AS.GA.IN OR AS.GA.SB OR GA.IN.SB OR AS.IN.P)/MF
L20        2123 S L17 AND L19
L21          11 S (L2 OR L9)(5A)L4 AND L20 AND L3
L22          16 S L18 NOT L21
L23  QUE MAX OR MAXIM? OR MIN OR MINIMUM? OR PEAK? OR VALLEY? OR (V OR U)(2A)(SHAPE?
OR PROFIL? OR GRAD? OR DISTRIB?)
L24        1032 S L23 AND (L2 OR L9)(5A)L4
L25      165838 S (L19 OR L1)
L26          53 S L24 AND L25
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L22 ANSWER 13 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1996:700493 HCAPLUS
TI Molecular beam epitaxy growth of indium-rich InxGa1-xAs/InyAl1-yAs/InP structures towards high **channel** conductivity for a high **electron mobility transistor** using a linearly **graded** buffer layer
AU Hong, Sang-Ki; Lee, Hae-Gwon; Lee, Jae-Jin; Kim, Sang-Gi; Pyun, Kwang-Eui; Park, Hyung-Moo
SO Journal of Crystal Growth (1996), 169(3), 435-442
CODEN: JCRGAE; ISSN: 0022-0248
AB InxGa1-xAs/InyAl1-yAs heterostructure with both **high** electron mobility and **high** carrier **concentration** was fabricated on InP substrate by MBE. The measured electron mobilities were 11,491 cm2/V·s at 300 K and 53,316 cm2/V·s at 77 K for two-dimensional electron gas concns. of 4.7 + 1012 and 3.5 + 1012 cm-2, resp. The **high** electron mobility and **concn** . resulted from the dislocation-free, relatively thick (200 Å), and high indium content (80%) **channel** layer. The high-quality InxGa1-xAs **channel** layer was successfully grown at a growth temperature of 520° after introducing a linearly **graded** InyAl1-yAs buffer structure grown at a reduced growth temperature of 420°. The cross-sectional TEM observation revealed that the dislocations generated due to a large lattice mismatch between InyAl1-yAs and InP substrate were locked up in the middle of the **graded** buffer layer. Probably the authors have achieved to date for this materials system the highest room-temperature conductivity (mobility times carrier concentration) of 5.4 + 1016/V·s.
IT **22398-80-7**, Indium phosphide (InP), properties 106097-59-0, Gallium indium arsenide (Ga0.47In0.53As) 106312-11-2, Aluminum indium arsenide (Al0.48In0.52As) 111446-08-3, Gallium indium arsenide (Ga0.25In0.75As) 111592-95-1, Gallium indium arsenide (Ga0.35In0.65As) 123213-49-0, Aluminum indium arsenide (Al0.25In0.75As) 124546-56-1, Aluminum indium arsenide (Al0.35In0.65As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(MBE growth of indium-rich InxGa1-xAs/InyAl1-yAs/InP structures towards high **channel** conductivity for a high **electron mobility transistor**)

L22 ANSWER 14 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN

AN 1996:393266 HCAPLUS

TI Carrier mobilities in **graded** InxGa1-xAs/Al0.2Ga0.8As quantum wells for high **electron mobility transistors**

AU Strass, U.; Bernklau, D.; Riechert, H.; Finkbeiner, S.

SO Journal of Applied Physics (1996), 80(1), 322-325
CODEN: JAPIAU; ISSN: 0021-8979

AB The authors investigate modulation-doped InxGa1-xAs/AlyGa1-yAs quantum wells grown by mol. beam epitaxy with respect to carrier mobility and its dependence on In content, In distribution, populations of electron subbands, and local positions of electron wave functions. The authors find that the room-temperature electron mobilities are dominated by the In contents at the maxima of the electron wave functions rather than by the average In contents. At 77 K the mobilities are most strongly influenced by the distance between doping layers and the maxima of the electron wave functions. As a practical result of this study, we present a quantum well structure for high **electron mobility transistors** (**HEMTs**) with a carrier mobility as high as 8100 cm2/V s at 295 K for an electron d. of 2.5+1012 cm-2.

IT **106070-25-1**, Gallium indium arsenide 106312-09-8, Aluminum gallium arsenide (Al0.2Ga0.8As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(carrier mobilities in **graded** InxGa1-xAs/Al0.2Ga0.8As quantum wells for high **electron mobility transistors**)

L21 ANSWER 5 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:889432 HCAPLUS
TI Degradation of InGaAs high **electron mobility transistors**: the role of **channel composition** and **thickness**
AU Meshkinpour, M; Goorsky, M S.; Streit, D C.; Block, T R.; Wojtowicz, M
SO Materials Research Society Symposium Proceedings (1995), 378(Defect and Impurity Engineered Semiconductors and Devices), 783-87
CODEN: MRSPDH; ISSN: 0272-9172
AB The authors examined the performance of AlGaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistors** with varying channel layer thicknesses for In mole fractions of 0.21 and 0.24. For both **compns.**, there is an optimum **channel thickness** above which the device performance is impaired. As expected the effective critical thickness of the In0.21Ga0.79As layer is higher. Surprisingly, however, TEM of the device structures indicates that the device performance is not impaired by the presence of a linear array of misfit dislocations. In fact, the devices with highest performance have misfit dislocations indicating that defect engineering may lead to improved performance in these structures. Also, device structures with poor performance have misfit dislocations along both of the <110> directions. Triple axis x-ray diffraction provides a nondestructive estimate of the dislocation densities present.
ST degrdn **HEMT** gallium indium arsenide; **channel thickness compn** degrdn transistor; misfit dislocation arsenide **HEMT**
IT 106495-76-5, Aluminum gallium arsenide (Al0.25Ga0.75As)
112003-92-6, Gallium indium arsenide (Ga0.76In0.24As)
115454-37-0, Gallium indium arsenide (Ga0.79In0.21As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(effects of **channel composition** and **thickness** on performance of aluminum gallium arsenide/gallium indium arsenide/gallium arsenide pseudomorphic **HEMT**)

L21 ANSWER 7 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:600140 HCAPLUS
TI High-performance InP-based **HEMT**'s with a **graded** pseudomorphic **channel**
AU Chough, K. B.; Hong, Brian W-P.; Caneau, C.; Song, J. I.; Jeon, K. I.; Hong, S. C.; Lee, K.
SO Conf. Proc. - Int. Conf. Indium Phosphide Relat. Mater., 6th (1994), 427-30 Publisher: IEEE, New York, N. Y.
CODEN: 60XAAN
AB Al0.48In0.52As/Ga1-xInxAs pseudomorphic **HEMT**'s with very high gate and channel breakdown voltages were successfully fabricated. To improve the breakdown characteristics, graded pseudomorphic Ga1-xInxAs and Al0.2In0.8P were adopted as a channel and Schottky layer, resp. Systematic studies reveal that the modification of the quantum-well **channel** by **grading** the **composition** considerably **changes** the **channel** breakdown (BVds) and output conductance (go) characteristics. **HEMT**'s with **graded** Ga1-xInxAs **channel** (x = 0.7 to 0.6) exhibited improved BVds (11 V) and go (40 mS/mm) compared with **HEMT**'s with uniform composition (x = 0.7) in the channel (BVds = 4 V and go = 80 mS/mm).
IT **106097-59-0**, Gallium indium arsenide (Ga0.47In0.53As) 106312-11-2, Aluminum indium arsenide (Al0.48In0.52As) **107103-00-4**, Gallium indium arsenide (Ga0.3In0.7As) **110602-51-2**, Gallium indium arsenide (Ga0.4In0.6As) **112173-69-0**, Gallium indium arsenide (Ga0.3-0.47In0.53-0.7As) 124504-14-9, Aluminum indium phosphide (Al0.2In0.8P) **167978-53-2**, Gallium indium arsenide (Ga0.3-0.4In0.6-0.7As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(fabrication of aluminum indium arsenide/gallium indium arsenide pseudomorphic **HEMTs** with very high gate and channel breakdown voltages)

L21 ANSWER 8 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:531679 HCAPLUS
TI **Graded-channel** InGaAs-InAlAs-InP high **electron mobility transistors**
AU Streit, Dwight c.; Block, Thomas R.; Wojtowicz, Michael; Pascua, Dimas; Lai, Richard; Ng, Geok I.; Liu, Po-Hsin; Tan, Kin L.
SO Journal of Vacuum Science & Technology, B: Microelectronics and Nanometer Structures (1995), 13(2), 774-6
CODEN: JVTBD9; ISSN: 0734-211X
AB The authors have fabricated pseudomorphic InGaAs-InAlAs-InP high **electron mobility transistors** by MBE with InxGa1-xAs **channels graded** from x = 0.60 to x = 0.80. Compared with device profiles using flat x = 0.80 channels the channel conductivity is improved by 24%. Hall mobility is improved from 10,750 to 12,200 cm2/V s at 295 K with sheet charge Ns of 3.6 + 1012 and 3.9 + 1012 cm-2 for the flat x = 0.80 and **graded-channel** profiles, resp. **Graded-channel** devices with 0.1 µm T gates obtained cutoff frequency fT = 305 GHz and maximum frequency of oscillation fmax = 340 GHz.
IT **22398-80-7**, Indium phosphide, properties **106097-59-0**, Gallium indium arsenide (Ga0.47In0.53As) 106312-11-2, Aluminum indium arsenide (Al0.48In0.52As) **107103-00-4**, Gallium indium arsenide (Ga0.3In0.7As) **107827-20-3**, Gallium indium arsenide (Ga0.2In0.8As) **110602-51-2**, Gallium indium arsenide (Ga0.4In0.6As) **111592-95-1**, Gallium indium arsenide (Ga0.35In0.65As) **164111-19-7**, Gallium indium arsenide (Ga0.2-0.4In0.6-0.8As)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(characterization of **graded-channel** InGaAs-InAlAs-InP high **electron mobility transistors**)

L21 ANSWER 9 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1995:344634 HCAPLUS
TI 0.10 μm **graded** InGaAs **channel** InP **HEMT** with 305 GHz fT and 340 GHz fmax
AU Wojtowicz, M.; Lai, R.; Streit, D. C.; Ng, G. I.; Block, T. R.; Tan, K. L.; Liu, P. H.; Freudenthal, A. K.; Dia, R. M.
SO IEEE Electron Device Letters (1994), 15(11), 477-9
CODEN: EDLEDZ; ISSN: 0741-3106
AB The authors report here 305 GHz fT, 340 GHz fmax, and 1550 mS/mm extrinsic gm from a 0.10 μm InxGa1-xAs/In0.52Al0.48As/InP **HEMT** with x graded from 0.60 to 0.80. This device has the highest fT yet reported for a 0.10 μm gate length and the highest combination of fT and fmax reported for any three-terminal device. This performance is achieved by using a **graded-channel** design which simultaneously **increases** the effective indium **composition** of the **channel** while optimizing **channel** thickness.
IT **22398-80-7**, Indium phosphide, properties 106312-11-2, Aluminum indium arsenide (Al0.48In0.52As) **107827-20-3**, Gallium indium arsenide (Ga0.2In0.8As) **110602-51-2**, Gallium indium arsenide (Ga0.4In0.6As) **164111-19-7**, Gallium indium arsenide (Ga0.2-0.4In0.6-0.8As)
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(elec. properties of **graded channel** high **electron mobility transistor** from)

L21 ANSWER 11 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1994:233305 HCAPLUS
TI A high-performance δ-doped GaAs/InxGa1-xAs pseudomorphic high **electron mobility transistor** utilizing a **graded** InxGa1-xAs **channel**
AU Shieh, Hir Ming; Hsu, Wei Chou; Hsu, Rong Tay; Wu, Chang Luen; Wu, T S
CS Dep. Electr. Eng., Natl. Cheng Kung Univ., Tainan, Taiwan
SO IEEE Electron Device Letters (1993), 14(12), 581-3
CODEN: EDLEDZ; ISSN: 0741-3106
AB A new δ-doped GaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistor** utilizing a **graded** In **composition** InGaAs **channel** grown by **low**-pressure metalorg. chemical vapor deposition was demonstrated. This new structure revealed an extrinsic transconductance as high as 175 (245) mS/mm and a saturation c.d. as high as 500 (690) mA/mm at 300 (77) K for a gate length of 2 μm. The maximum transconductance vs. gate bias extended a broad and flat region of more than 2 V at 300 K. In addition, a low gate leakage current (<10 μA at -7 V) at 300 K was obtained.
IT **106070-25-1**, Gallium indium arsenide **136770-03-1**, Gallium indium arsenide ga0.75-0.8in0.2-0.25as
RL: USES (Uses)
(high **electron mobility transistor** based on graded, with gallium arsenide, fabrication and characteristics of)
IT **107498-92-0**, Gallium indium arsenide ga0.8in0.2as
RL: USES (Uses)
(high **electron mobility transistor** based on, with gallium arsenide, fabrication and characteristics of)

L21 ANSWER 2 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2001:868847 HCAPLUS
TI High **electron mobility transistor** semiconductor structures with **graded** layer and **channel** layer over donor/barrier layer
IN Hoke, William E.; Lemonias, Peter J.; Kennedy, Theodore D.
PA Raytheon Company, USA
PI US 6489639 B1 20021203 US 2000-577508 20000524
PRAI US 2000-577508 A 20000524
WO 2001-US40379 W 20010326
AB A semiconductor structure, e.g., a high **electron mobility transistor** structure, is formed by using metamorphic growth and strain compensation. The structure includes a substrate, a graded layer over the substrate, a 1st donor/barrier layer over the **graded** layer, and a **channel** layer over the 1st donor/barrier layer. The substrate has a substrate lattice constant, and the graded layer has a graded lattice constant The graded layer has a 1st lattice constant near a bottom of the graded layer substantially equal to the substrate lattice constant and a 2nd lattice constant near a top of the graded layer different than the 1st lattice constant The 1st donor/barrier layer has a 3rd lattice constant, and the channel layer has a 4th lattice constant The 2nd lattice constant is intermediate the 3rd and 4th lattice consts.
IC ICM H01L029-778
ICS H01L021-335
ST high **electron mobility transistor** **graded channel** donor barrier layer
IT High-**electron-mobility transistors**
Molecular beam epitaxy
(high **electron mobility transistor** semiconductor structures with **graded** layer and **channel** layer over donor/barrier layer)
IT **107498-91-9**, Gallium indium arsenide (Ga0.7In0.3As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(relaxed contact layer; high **electron mobility transistor** semiconductor structures with **graded** layer and **channel** layer over donor/barrier layer)
IT **22398-80-7**, Indium phosphide, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(substrate; high **electron mobility transistor** semiconductor structures with **graded** layer and **channel** layer over donor/barrier layer)

L21 ANSWER 3 OF 11 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 2000:201513 HCAPLUS
TI Study of doping **concentration** variation in InGaAs/InP **high electron mobility transistor** layer structures by Raman scattering
AU Radhakrishnan, K.; Patrick, T. H. K.; Zheng, H. Q.; Zhang, P. H.; Yoon, S.F.
SO Journal of Vacuum Science & Technology, A: Vacuum, Surfaces, and Films (2000), 18(2), 713-716 (Mar/Apr issue)
CODEN: JVTAD6; ISSN: 0734-2101
AB The effect of varying the dopant concentration (ND) in the InP donor layer of In0.53Ga0.47As/InP high-**electron-mobility transistor** (**HEMT**) structure was studied by Raman scattering measurements. The carrier concentration in the InGaAs **channel** was found to **increase** when the doping **concentration** in the donor layer was increased assuming that the donors are fully ionized. The coupled mode between the InGaAs longitudinal optical phonons and the electrons in the InGaAs channel shifts continuously to a lower wave number with the increase in the value of ND in the InP donor layer. The correlation between the observed Raman shift with the carrier concentration in the channel layer can be used to characterize the **HEMT** structures nondestructively.
ST gallium indium arsenide high **electron mobility transistor** doping; indium phosphide high **electron mobility transistor** doping
IT Doping
High-**electron-mobility transistors**
(study of doping concentration variation in gallium indium arsenide/indium phosphide high-**electron-mobility transistor** layer structures by Raman scattering)
IT **22398-80-7**, Indium phosphide, uses **106097-59-0**, Gallium indium arsenide (Ga0.47In0.53As)
RL: DEV (Device component use); USES (Uses)
(study of doping concentration variation in gallium indium arsenide/indium phosphide high-**electron-mobility transistor** layer structures by Raman scattering)

L22 ANSWER 11 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:333246 HCAPLUS
TI Room-temperature photoreflectance and photoluminescence characterization of the AlGaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistor** structures with **varied** quantum well **compositional profiles**
AU Lin, D. Y.; Liang, S. H.; Huang, Y. S.; Tiong, K. K.; Pollak, Fred H.; Evans, K. R.
SO Journal of Applied Physics (1999), 85(12), 8235-8241
CODEN: JAPIAU; ISSN: 0021-8979
AB Using room-temperature photoreflectance (PR) and photoluminescence (PL) the authors have characterized four pseudomorphic AlGaAs/InGaAs/GaAs high **electron mobility transistor** structures with **varied** quantum well **compositional profiles**. Several features from the InGaAs modulation doped quantum well portion of the samples were observed in addition to signals from the AlGaAs, GaAs, and GaAs/AlGaAs superlattice (SL) buffer layer. The PR spectra from the InGaAs quantum well **channel** can be accounted for by a line shape function which is the 1st derivative of a step-like two-dimensional d. of states and a Fermi level filling factor. A detailed line shape fit makes it possible to evaluate the Fermi energy, and hence the concentration of two-dimensional electron gas in addition to the energies of the intersubband transitions. The lowest lying intersubband transition was confirmed by a comparison of the PR and PL spectra. From the difference of intersubband transition energies, the surface segregation effects of In atoms are demonstrated. Other important parameters of the system such as built-in elec. field, Al composition, as well as the properties of the GaAs/AlGaAs SL buffer layer are evaluated.
IT **106070-25-1**, Gallium indium arsenide
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(**compositional profile**; room-temperature photoreflectance and photoluminescence characterization of AlGaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistor** structures with **varied** quantum well **compositional profiles**)
IT 37382-15-3, Aluminum gallium arsenide ((Al,Ga)As) 107874-87-3, Aluminum gallium arsenide al0.24ga0.76as 108424-56-2, Gallium indium arsenide ga0.78in0.22as
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(room-temperature photoreflectance and photoluminescence characterization of AlGaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistor** structures with **varied** quantum well **compositional profiles**)

L22 ANSWER 12 OF 16 HCAPLUS COPYRIGHT 2004 ACS on STN
AN 1999:41812 HCAPLUS
TI Room-temperature phototransmittance and photoluminescence characterization of the AlGaAs/InGaAs/GaAs pseudomorphic high **electron mobility transistor** structures with **varied** quantum well **compositional profiles**
AU Lin, D. Y.; Huang, Y. S.; Tiong, K. K.; Pollak, F. H.; Evans, K. R.
SO Semiconductor Science and Technology (1999), 14(1), 103-109
CODEN: SSTEET; ISSN: 0268-1242
AB We have studied the effects of the two-dimensional electron gas (2DEG) and indium surface segregation in four pseudomorphic AlGaAs/InGaAs/GaAs high **electron mobility transistor** structures using room-temperature phototransmittance (PT) and photoluminescence (PL) measurements. The PT spectra from the InGaAs modulation-doped quantum well **channel** can be accounted for by a lineshape function which is the first-derivative of a step-like two-dimensional d. of states and a Fermi level filling factor. A detailed lineshape fit makes it possible to evaluate the Fermi energy, and hence the concentration of 2DEG in addition to the energies of the intersubband transitions. The lowest-lying intersubband transition was confirmed by a comparison of the PT and PL spectra. From the difference of intersubband transition energies, the surface segregation effects of indium atoms are demonstrated.
IT 108424-56-2, Gallium indium arsenide (Ga0.78In0.22As)
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process); USES (Uses)
(quantum well; photoluminescence of AlGaAs/InGaAs/GaAs high **electron mobility transistors** with indium surface segregation from quantum well **channel** layer)